America's Energy Future: Charting a Course for Energy Security, Reliability and Independence

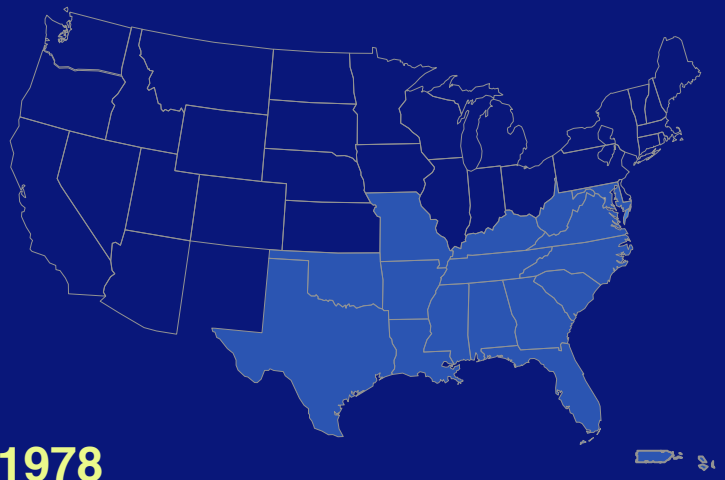
Southern Legislative Conference
July 28, 2012

Ken Nemeth
Southern States Energy Board

Background

Through innovations in energy and environmental policies, programs and technologies, the Southern States Energy Board enhances economic development and the quality of life in the South.

- SSEB Mission Statement



- **Established 1960, expanded in 1978**
- **16 U.S. States and Two Territories**
- **Each jurisdiction represented by the governor, a legislator from the House and Senate and a governor's alternate**
- **Federal Representative Appointed by U.S. President**

Six Megatrends Facing the World

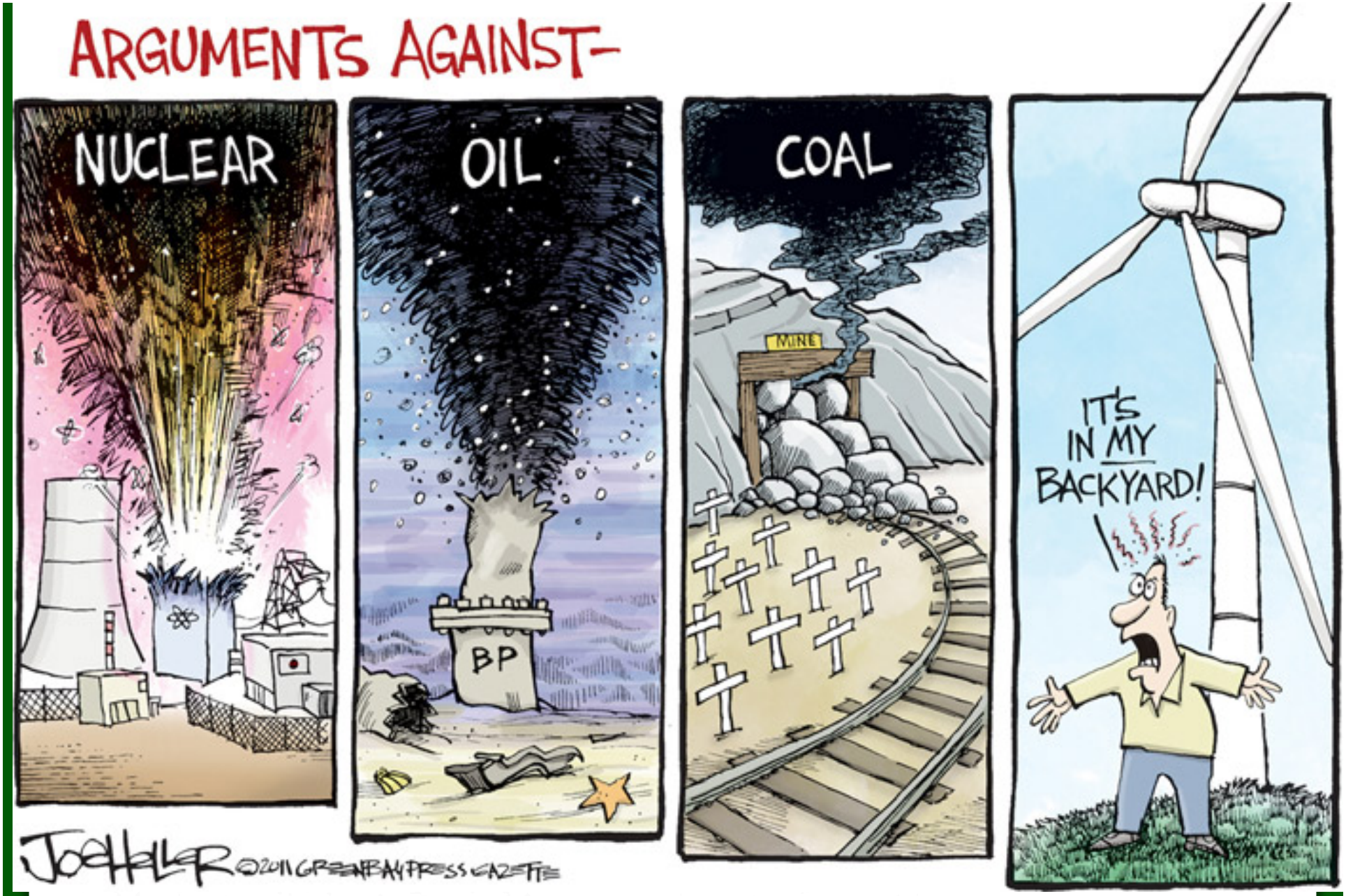
- Population Growth- 1 of 3 Chinese or Indian
- Food Production
- Renewable Energy
- Demand for Safety, Security
- Connectivity Innovation
- World Recession

ENERGY RESOURCES:
Limits in Supply & Price

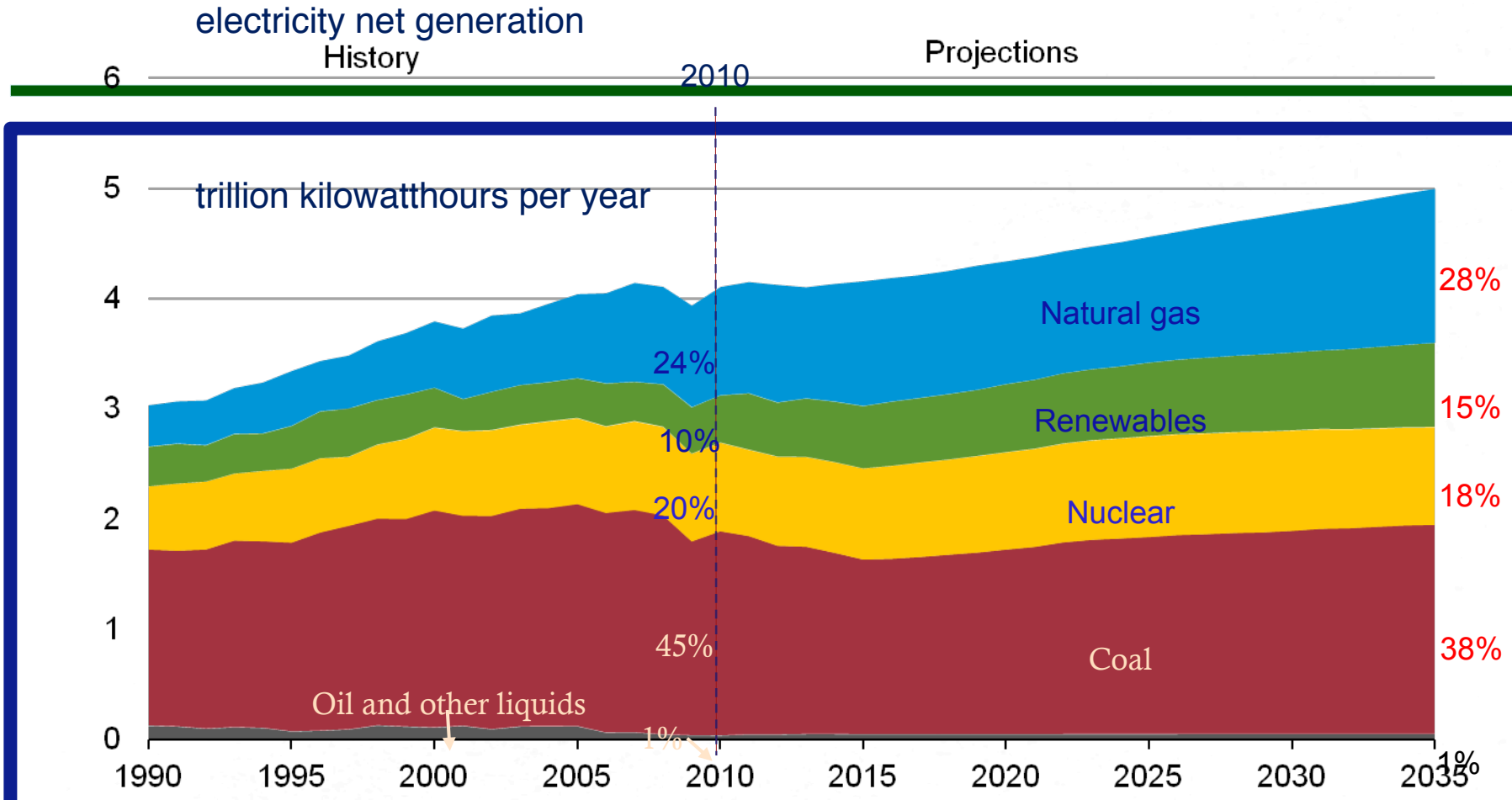
All Energy Forms Needed for Diversity of Supply

- **ENERGY EFFICIENCY/DEMAND-SIDE MANAGEMENT/CONSERVATION:**
  An important resource – augments future power supply
- **OIL:** *Consistently above $80/barrel; reserves and supply*
- **NUCLEAR:** *Cost, safety & waste disposal concerns*
- **HYDRO:** *Limited, regionalized growth in supply*
- **WIND:** *Limited availability; grid disruptions; intermittent supply; PTC needs*
- **BIOMASS:** *Limited, regional supply, environmental questions*
- **NATURAL GAS:** *Price volatility; uncertainty of environmental issues; pipeline constraints*
- **COAL:** *Faces GHG, regulatory, environmental challenges*
- **SOLAR:** Cost of materials; intermittent supply ; PTC needs

ARGUMENTS AGAINST-



Electricity Mix Shifts to lower-carbon options- renewables and natural gas growth



Source: EIA, Annual Energy Outlook 2012

SOUTHERN STATES

ENERGY BOARD

Southern States Regional Energy Profiles

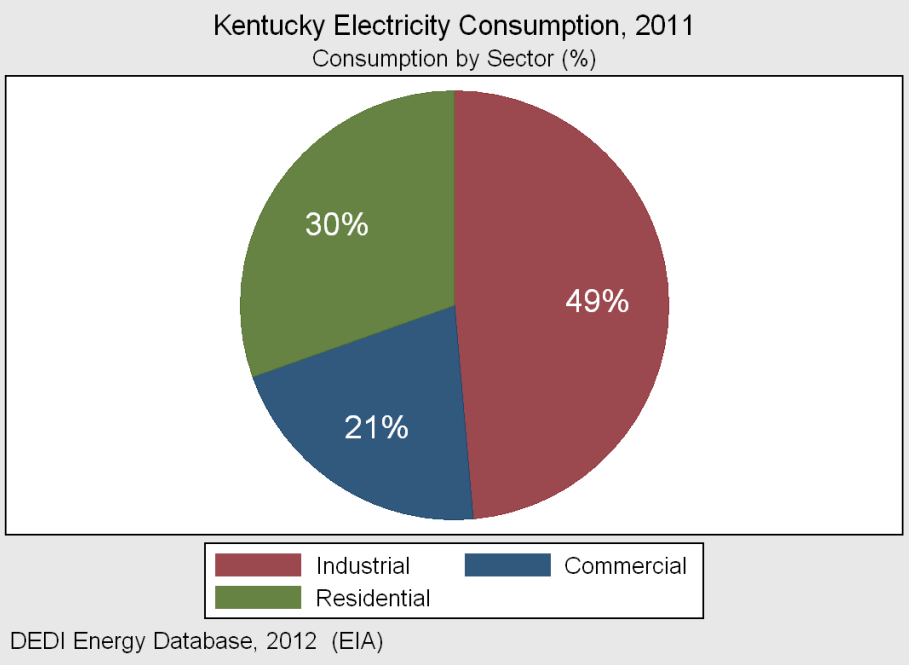
2012

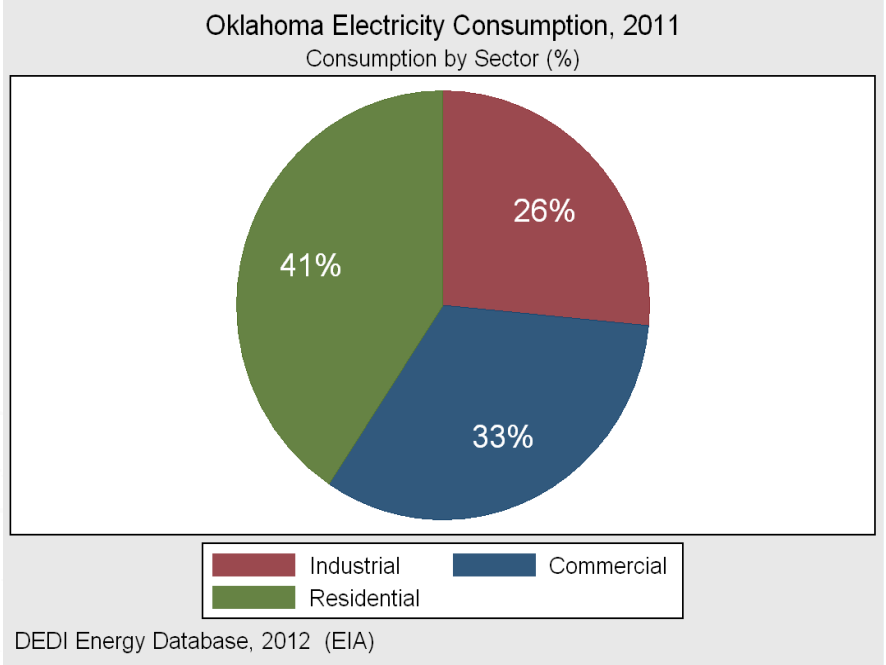
Developed by **DEDI**

Energy Facts in the South (2011)

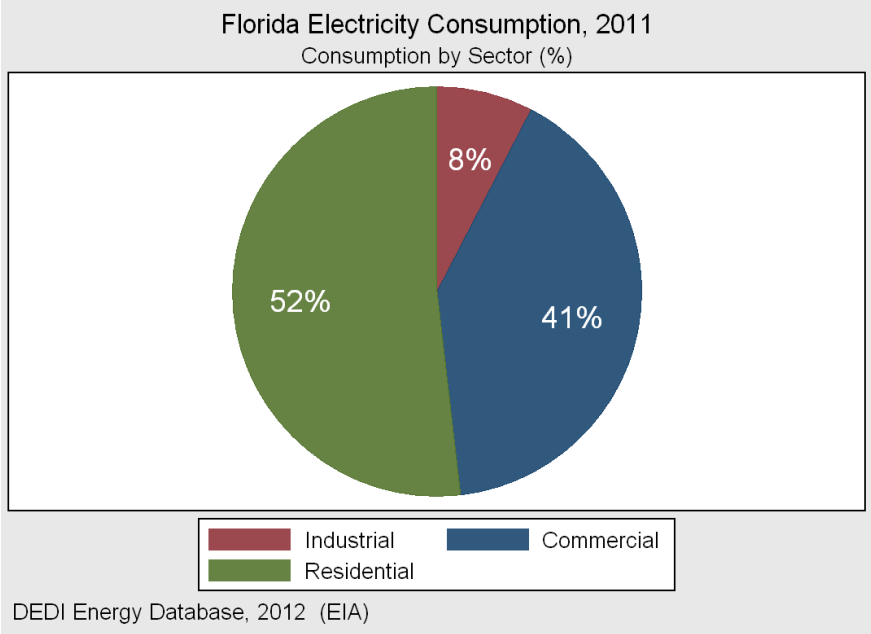
- Electricity consumption in region represents 47% of national consumption (1,754 of 3,726 Billion KWh)
  - 51% of residential electricity consumption (729 Billion KWh)
  - 44% of commercial and industrial consumption (590 B KWh commercial/ 434 B KWh industrial)
- Electricity production in region represents 47% of national electricity generated (1,920 of 4,106 B KWh)
  - 59% of natural gas generation nationwide is generated in the southern region (600 B KWh)
  - 49% of coal fired generation (848 B KWh)
  - 44% of nuclear power generation (344 B KWh)
  - 31% of wind generation (38 B KWh)
  - 14% of hydroelectric generation (45 B KWh)
- Electricity Prices
  - Residential: 10.42 cents/KWh in south v 11.42 nationwide
  - Commercial: 8.86 cents/KWh in south v 9.99 nationwide
  - Industrial: 6.09 cents/KWh in south v 6.67 nationwide)
  - Average: 8.82 cents/KWh in south v 9.67 nationwide

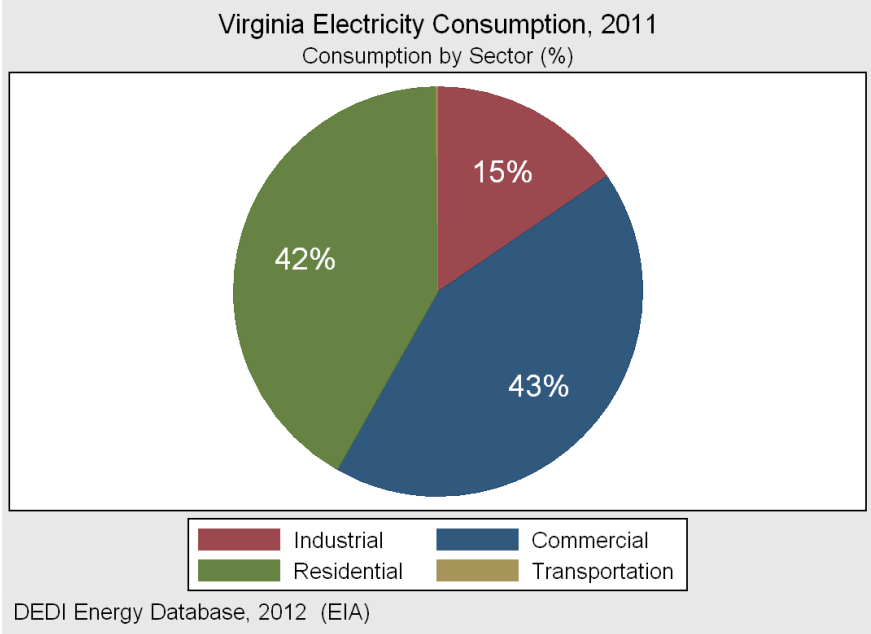
Electricity Consumption
2011 KY v OK



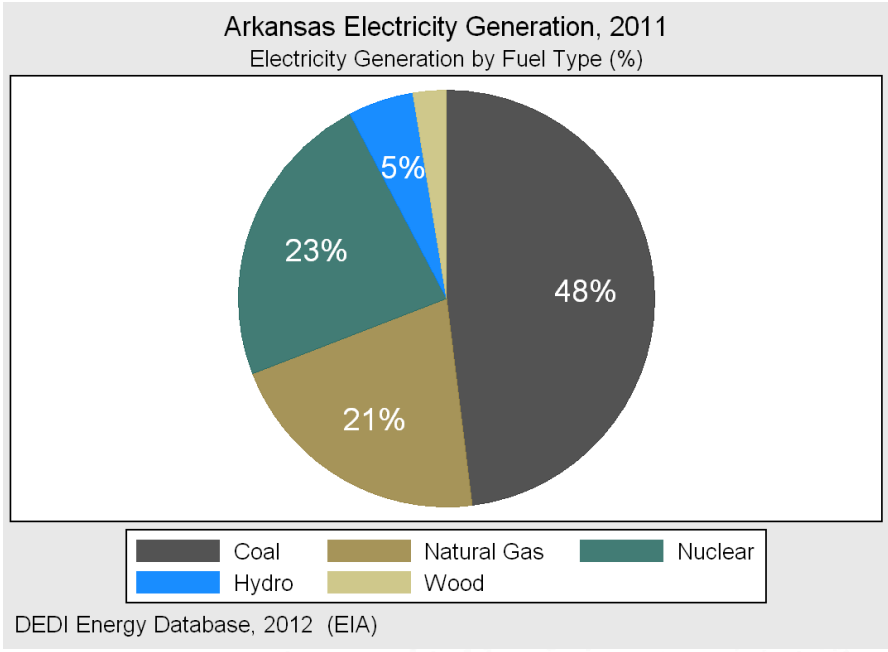


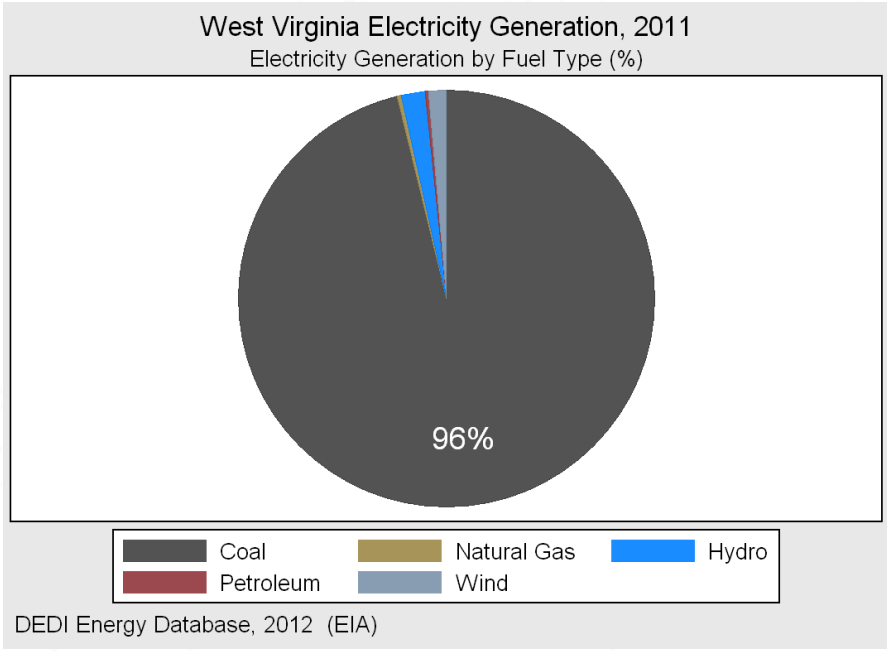
Electricity Consumption
2011 FL v VA



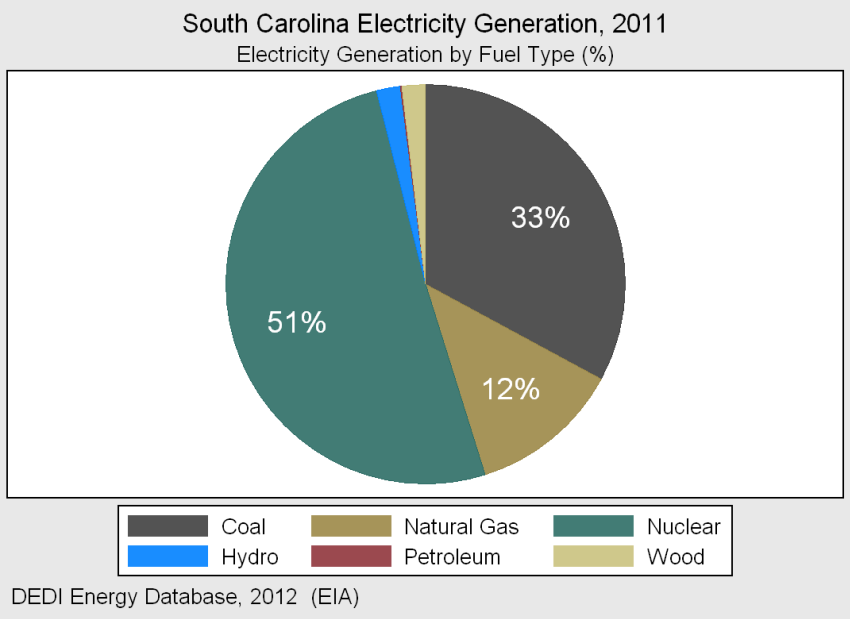


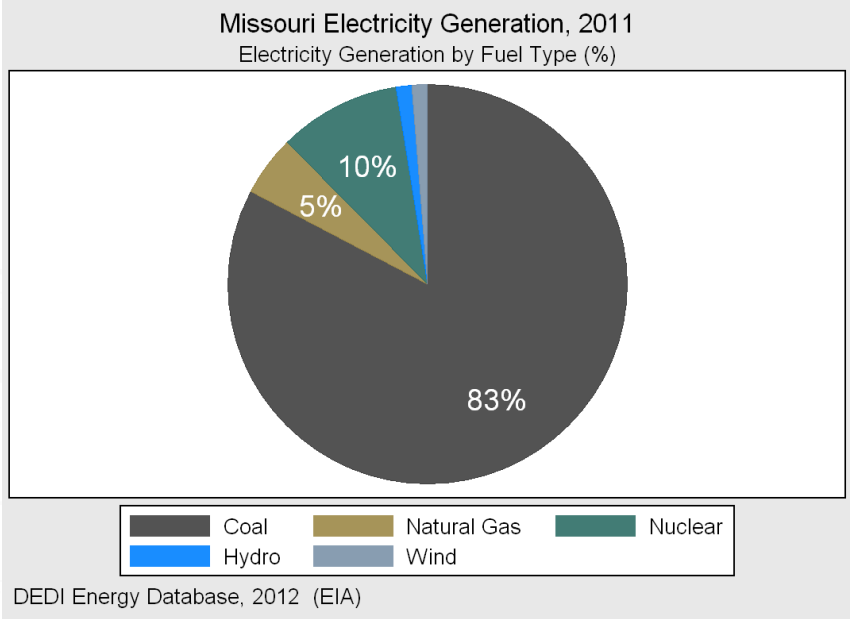
Electricity Generation
2011 AR v WV



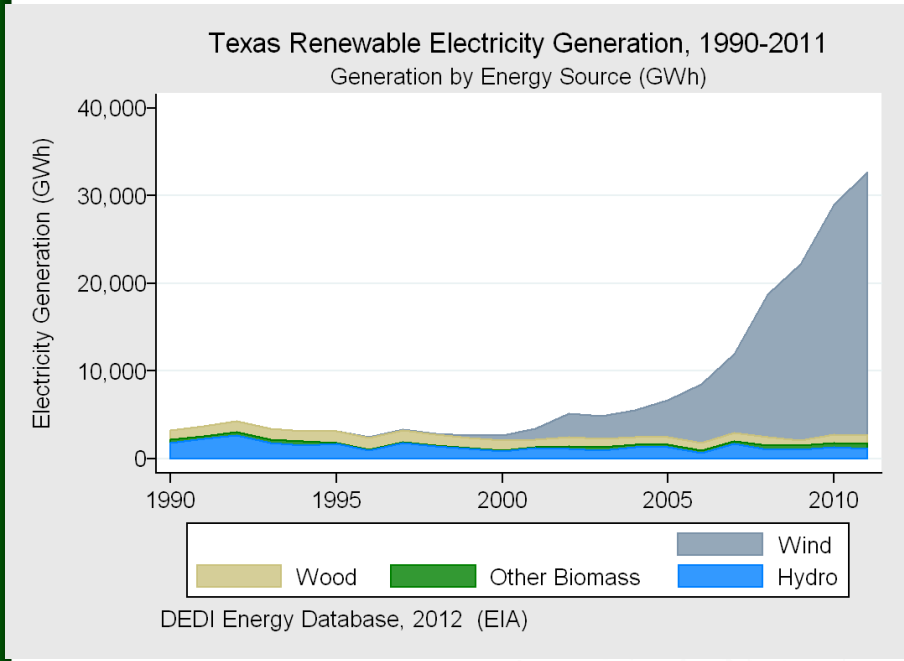


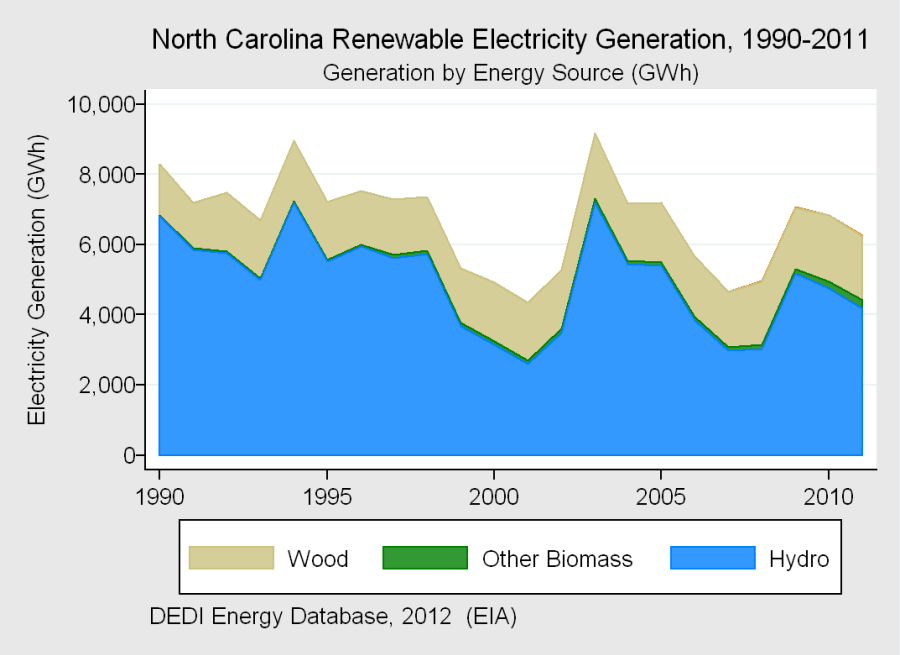
Electricity Generation
2011 SC v MO

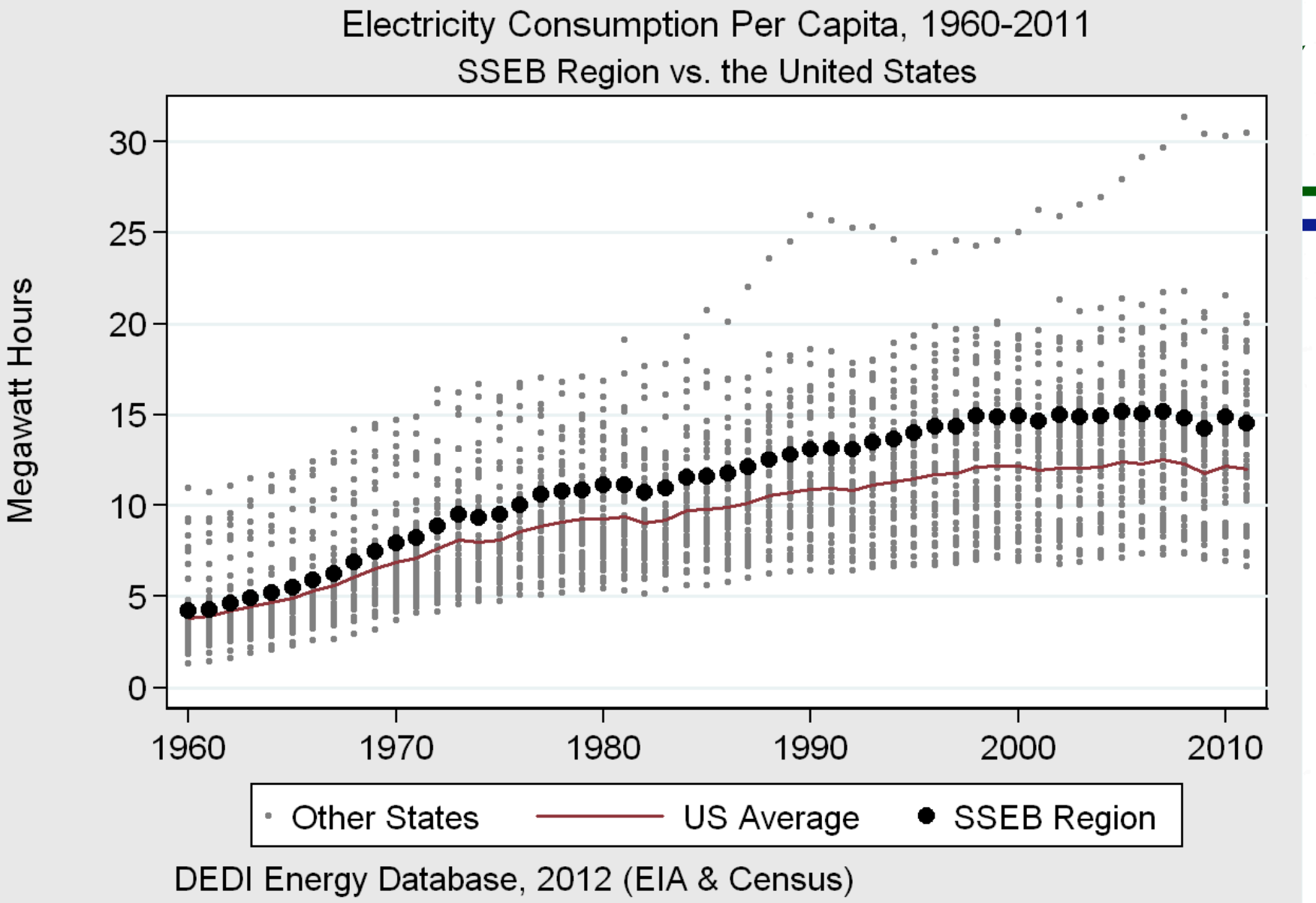




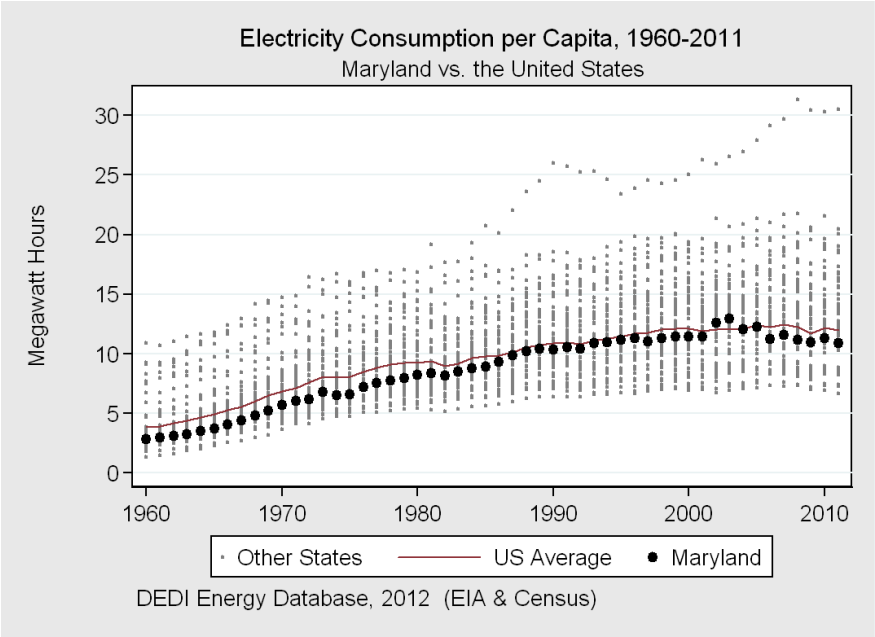
Renewable Electricity Generation 1990-2011 TX v NC

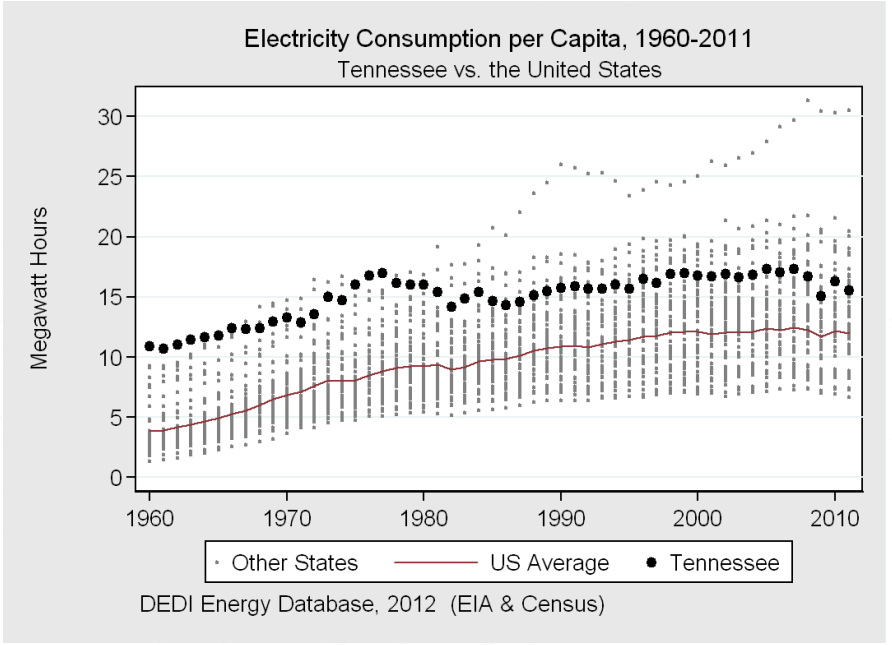




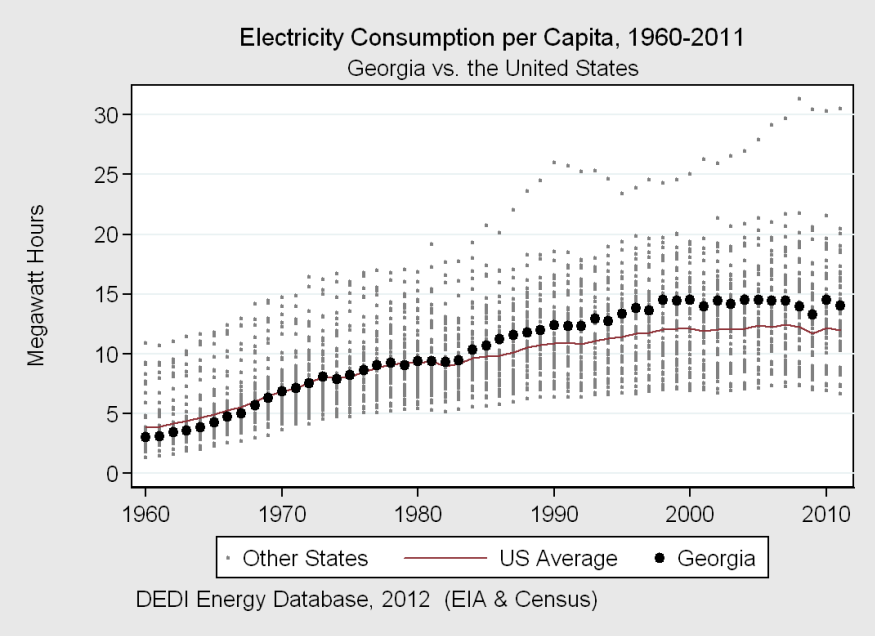

Electricity Consumption Per Capita, 1960-2011
SSEB Region vs. the United States
Megawatt Hours
30
25
20
15
10
5
0
1960
1970
1980
1990
2000
2010
Other States
US Average
SSEB Region
DEDI Energy Database, 2012 (EIA & Census)

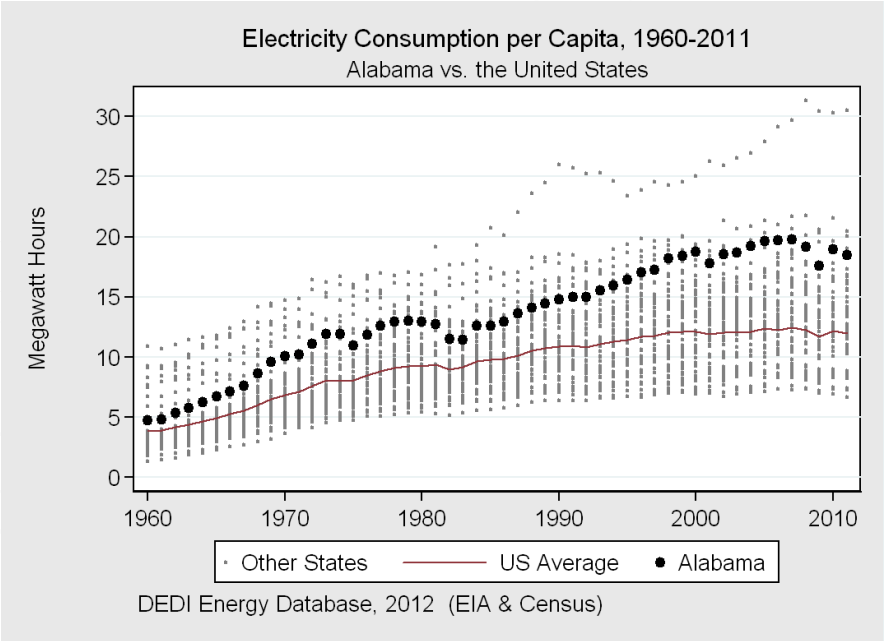
Electricity Use Per Capita
1960 - 2011 MD v TN



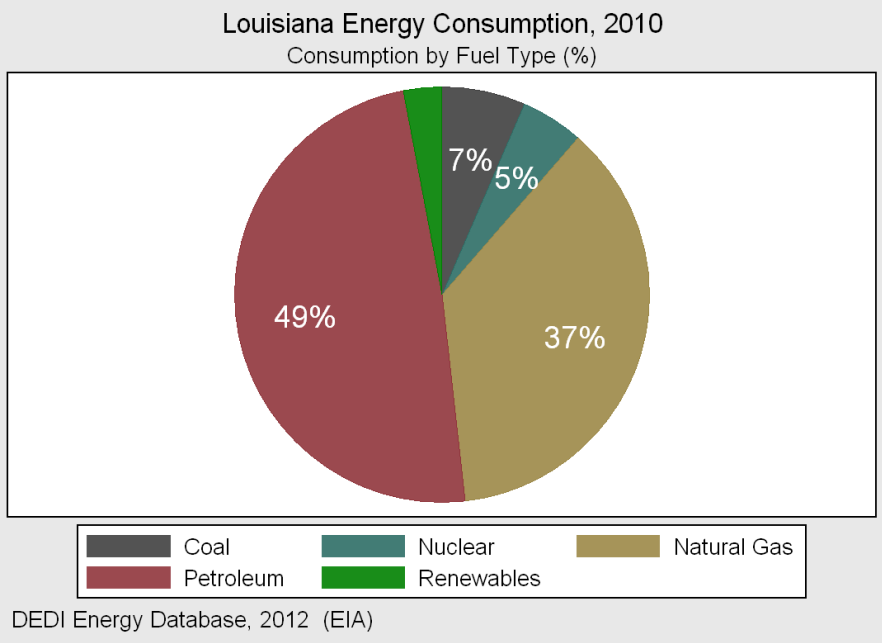


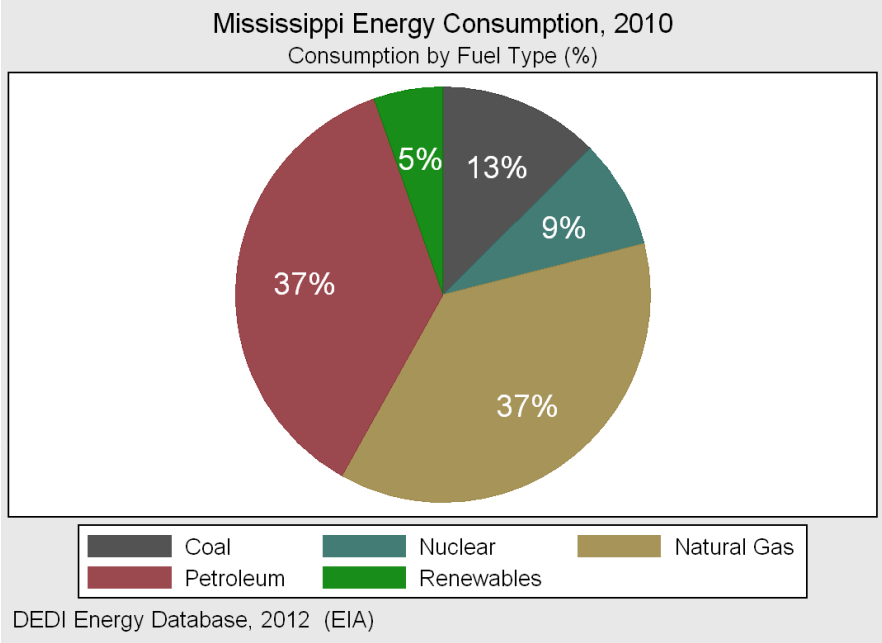
Electricity Use Per Capita
1960 - 2011 GA v AL





Energy Consumption
2011 LA v MS





Natural Gas

Natural gas is challenging coal as a base load generating option

- **Low Cost of natural gas**
- **Short lead time**
- **Easier to site**
- **Lower carbon emissions**
- **Lower capital costs**
- **Small increments of capacity**

Natural Gas & Electric Power Interdependency Issues

Dec 2011 NERC Special Reliability Assessment:
Primer of Natural Gas and Electrical Power Interdependency in the United States

Pipeline infrastructure planning recognizes growth of gas-fired generation & use of gas as more base-load power supply

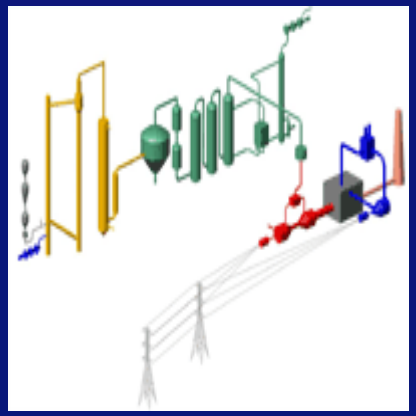
- Storage facilities must be flexible and multiple cycle
- Information must be shared between gas & electric industries
- Common terms and contracts must be developed
- Planning & operation within each industry must account for nuances in the other industry

Status of Coal-Fired Power Plants

- 24 coal-fired projects underway (10 under construction, 13 permitted, 1 near construction) – 15,773 MW
- Delays, Cancellations
  - Regulatory Uncertainty, Climate Change
  - Economic conditions
  - Escalating costs and Financeability
- Early plant closures
  - Boardman, Oregon (2020); TVA IRP; FPL Cape Canaveral; Seminole
- Recent completions include 3,728 MW of coal capacity:
  - Dry Fork (390 MW)
  - Oak Creek (615 MW)
  - Point Comfort (310 MW)
  - Whelan (220 MW)
  - Longview (808 MW)
  - Prairie State unit 1 (IL) (800 MW) *June 2012
  - Virginia City Hybrid Energy Center (585 MW) *July 2012
- 1990-2007 Averaged ~ 1000 MW/ year in U.S.
  - Skilled resources reduced
  - Scarcity of labor in power plant engineering, procurement, project management, construction activities

Kemper County, MS IGCC Plant

- **Technology**:
  - Advanced gasification technology
  - IGCC process sends coal through a gasifier, subjects coal to high temperatures and high pressure, coal undergoes chemical reaction creating syngas.
- **Fewer emissions** –
  - Cleaner syngas used in a gas turbine to generate power with fewer emissions than traditional coal plants
    - 90 percent mercury removal
    - 99 percent sulfur dioxide removal
    - 99 percent particulate removal
- **Carbon capture** - initial CO_2 capture of 65 %
  - CO2 has been sold to Denbury
- **Fuel source** – local lignite



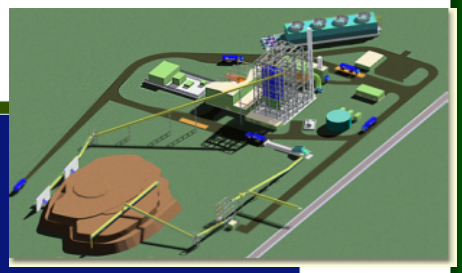
SECARB 7th Annual Stakeholders' Briefing - March 2012

Capture Unit Tour at Plant Barry - Alabama

Nuclear Energy in the South

- Current Status: 44 GW in 13 states, 353 Billion Kwh (43% of US)
- Potential Nuclear Capacity Additions include:
  - TN (TVA) Watts Bar 2: 1.2 GW (Cost $4- 4.5 B) (2013-15)
  - AL(TVA) Bellefonte 1-2: 2.4 GW (2018-20)
  - GA (GA Pwr) Vogtle 3-4: 2.2 GW (2016-17)
  - SC(Santee Cooper) Summer 2-3: 2.2 GW (2017-18)
- Small Modular Reactors
  - DOE funding: Potential sites include SRS, Missouri
  - TVA has included SMR in its IRP
  - Need for NRC design approval
- LIFE – Laser Inertial Fusion Energy Potential

Biomass Success and Announcements



- Consortium for National Feedstock Resource Center
  - Biofuels from invasive species in the South (e.g., Red Cedar)
- INEOS New Planet Energy (Indian River County, FL)- USDA Loan
  - $75 Million, Production of 8 million gallons cellulosic ethanol Plus 6 MW
  - Feedstock: vegetative waste, yard/wood waste, MSW
- DOE Loan Guarantee to Diamond Green Diesel LLC – Norco, LA
  - $241 Million conditional commitment/ 137 Million Gallons/year
  - Feedstock: Animal fat and other waste grease
- East Texas wood waste electrical generating plant – Lufkin
  - $128 Million plant, Capacity of 50 MW
- Wood burning power plant approved in Gainesville, FL – 100 MW


CALL THIS A WINDFARM ?
BE PATIENT. THIS SUMMER THEY'LL BE 60 FEET TALL.
searchID: mfln2563
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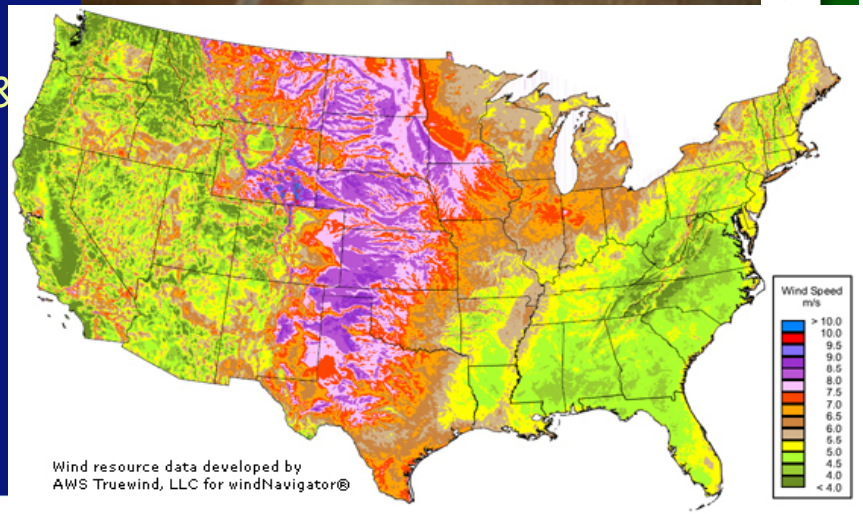
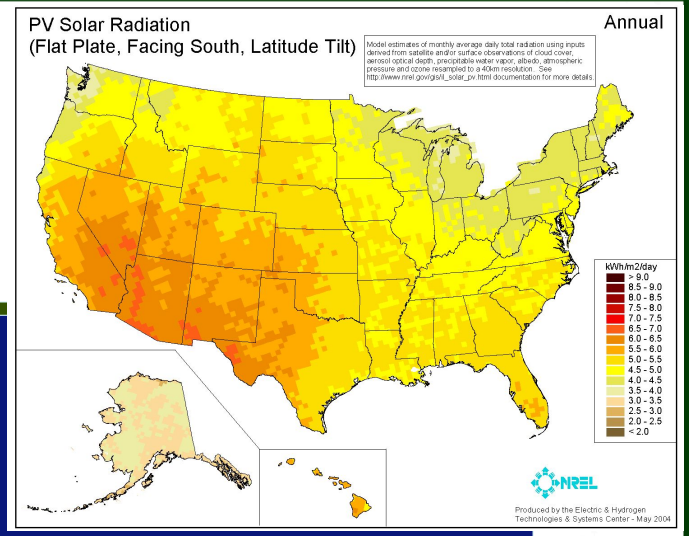
Wind Generation

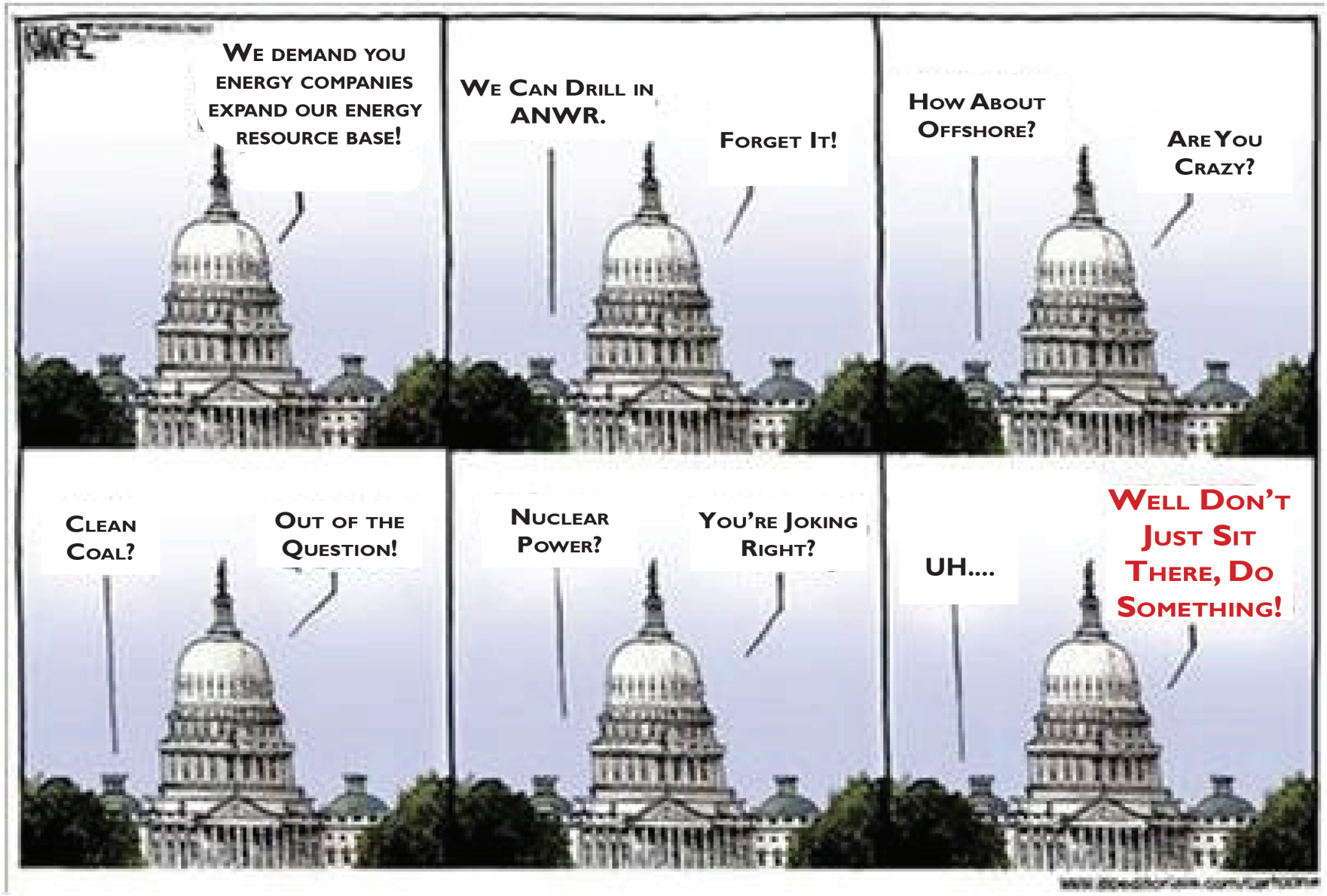
- Capacity added(2011): 6,810 MW
- Total Capacity: 47,000 MW in US
- Generation (2011): 119.7 Billion Kwh
- Generation increase fivefold over 5 years (26.6 to 119.7 B Kwh)
- Levelized Cost of Electricity: 150 $/MWH in 1980s to 50 $/MWH today
- Average Capacity Factor: 31%%
- Offshore wind potential being explored in SC & other coastal states
- SSEB state wind capacity:
  - Texas: 10,337 MW
  - Oklahoma: 2,007 MW
  - West Virginia: 564 MW
  - Missouri: 459 MW



Solar

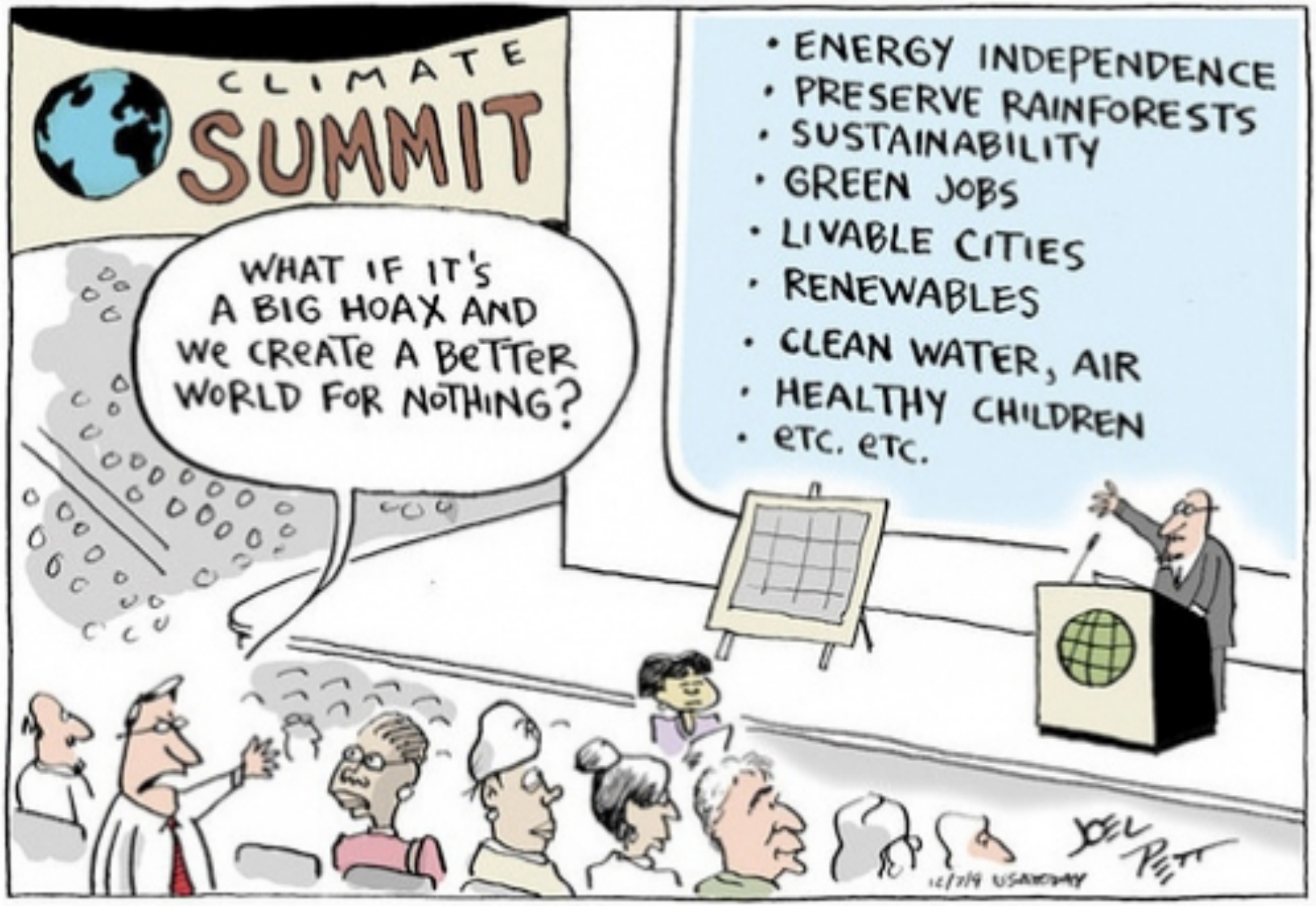


- FPL Group (FL): 110MW on line
  - DeSoto Next Generation Solar Center 25 MW – 90,000 PV panels
  - Martin Solar Center: 75 MW
  - Space Coast Center: 10 MW
- Georgia Power IRP plans: 50 MW by 2015
  - Four sites between 1 and 30 MW
- Southern Company-Ted Turner: 30 MW solar farm in NM
  - Cimarron Solar Facility
- Duke Energy (NC): 16 MW PV solar farm plus 10 MW solar energy system
- Apple (NC): 20 MW end-user owned onsite solar array for major distribution center
- Austin Energy (TX): 35 MW Webberville Solar Project


WE DEMAND YOU ENERGY COMPANIES EXPAND OUR ENERGY RESOURCE BASE!
WE CAN DRILL IN ANWR.
FORGET IT!
HOW ABOUT OFFSHORE?
ARE YOU CRAZY?
CLEAN COAL?
OUT OF THE QUESTION!
NUCLEAR POWER?
YOU'RE JOKING RIGHT?
UH....
WELL DON'T JUST SIT THERE, DO SOMETHING!

Charting a Path *Toward Energy Independence*

- Promote **Electricity system Infrastructure** Investments
  - ❑ ***Modernize the grid including cybersecurity protections***
- Increase supply of domestic resources such as natural gas by developing model regulations and rules for **hydraulic fracturing** – safety, permitting, etc
  - ❑ ***SSEB's 'Guide to State Oil and Gas Regulation Entities in the South'***
- Promote increased Clean Coal Funding- **IGCC and CCUS with Supercritical** Coal Capacity and Enhanced Oil Recovery
  - ❑ ***SSEB's Carbon Management program through DOE***
- Promote state model legislation / regulation to ensure **commercialization of CCUS**
  - ❑ ***SSEB's 'Carbon Capture and Sequestration Legislation in the United States of America'***
- Promote renaissance of **nuclear power** in the south
  - ❑ ***SSEB's Nuclear Energy: Cornerstone of Southern Living, Today and Tomorrow***
- Promote **prudent investments** in renewable energy and energy efficiency (focused state building codes on energy & water)
  - ❑ ***Explore regional Renewable Portfolio Standard or Clean Energy Standard or rate recovery mechanisms for utility efficiency programs***
  - ❑ ***Develop model state legislation to promote utility investment / utility feed in tariffs for solar***
  - ❑ ***Promote extension of the Production Tax Credit for the Wind Industry***
- Assist in removing barriers to full realization of **Combined Heat and Power potential**
  - ❑ ***TX: 17.3 GW; LA: 6.9 GW; FL: 3.4 GW; VA: 1.7 GW***


CLIMATE
SUMMIT
WHAT IF IT'S A BIG HOAX AND WE CREATE A BETTER WORLD FOR NOTHING?
• ENERGY INDEPENDENCE
• PRESERVE RAINFORESTS
• SUSTAINABILITY
• GREEN JOBS
• LIVABLE CITIES
• RENEWABLES
• CLEAN WATER, AIR
• HEALTHY CHILDREN
• ETC. ETC.
JOEL PETT

Presented by:
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West Virginia Energy Outlook & Issues

- Mountaineer CCS Commercial project
  - 20 MW product validation facility success
  - Status: Shelved
- Spruce No. 1 Surface Mine- EPA disallowed earlier permit approval but ruling was overturned
- Coal power plant closings in WV – up to 17% of net boilerplate capacity by 2015
- Carbon Capture and Storage Task Force Report
- Marcellus Shale: Natural Gas
- AES 32 MW Battery Energy Storage Project integrated with 98 MW Laurel Mountain Wind Project
- Coal: Foreign Exports continue, especially met coal to China

Recent West Virginia Energy Focus

- Senator Manchin 'Open House' with Congressional leaders-6/2012
  - Senators Murkowski (AK) and Wyden (OR) likely ranking member & Chair of Senate Energy Committee
  - Focus on balanced energy policy of West Virginia
    - Visit Mt Storm coal plant
    - Ned Power Mt Storm Wind project
    - Mountain Laurel complex – state coal mining operations and mine reclamation sites
    - Hydro power plant & Marcellus shale extraction site
  - Governor Tomblin Natural Gas Vehicle Task Force
    - Feasibility of natural gas as fuel source for state vehicle fleet
    - CNG infrastructure including fueling stations
    - Partnerships: Natural gas producers, industry, vehicle manufacturers, infrastructure developers